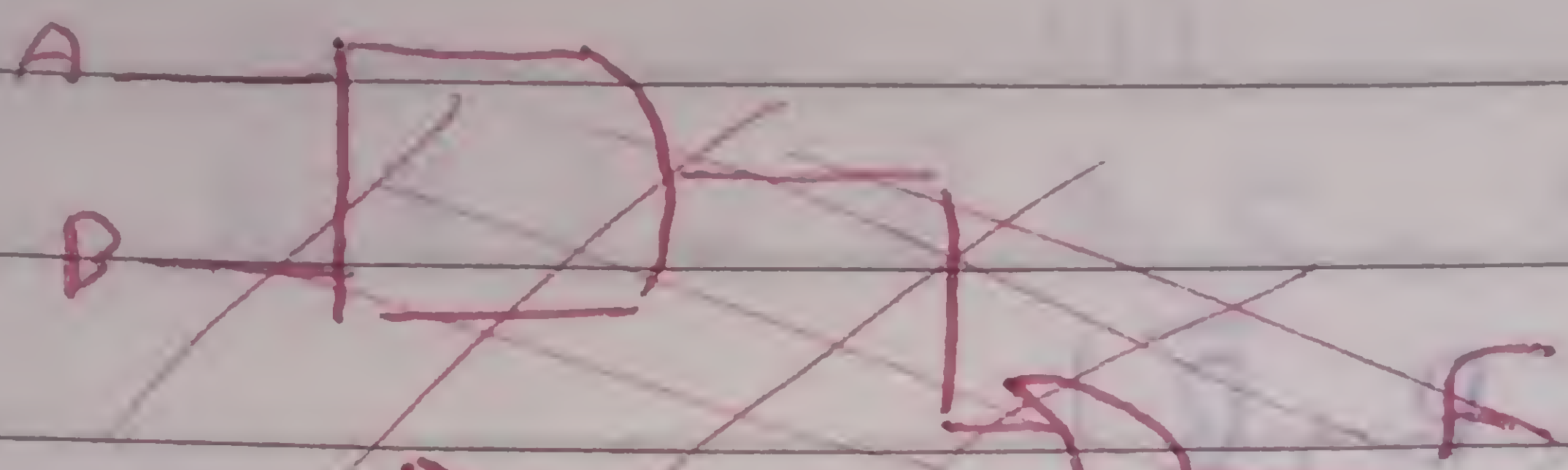


Boolean Function

Function

$$F = A \cdot B + \bar{C}$$



الشكل القياسي (Standard form) (كل input موجود (0 و 1))

$$F_3 = A \cdot B \cdot C + A \cdot B \cdot \bar{C} + A \cdot \bar{B} \cdot C + A \cdot \bar{B} \cdot \bar{C}$$

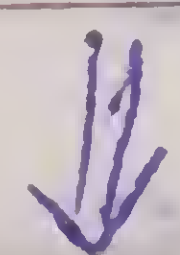
الكتابة
التي
تحتوي

Analysis: circuit \rightarrow Truth Table

Design: Truth Table \rightarrow circuit

A	B	C	F_3	F_4
0	0	0	0	1
0	0	1	0	0
0	1	0	0	1
0	1	1	1	0
1	0	0	1	1
1	0	1	0	0
1	1	0	1	1
1	1	1	1	1

$$F_4 = A \cdot B + \bar{C} \quad (\text{الشكل المختصر})$$



لوحات الكتيبة بطريقة ثانية
(الشكل المطول)

$$F_4 = A \cdot B \cdot \bar{C} + \bar{A} \cdot B \cdot \bar{C} + A \cdot \bar{B} \cdot \bar{C} + A \cdot B \cdot C + A \cdot B \cdot \bar{C} + A \cdot \bar{B} \cdot C + \bar{A} \cdot \bar{B} \cdot C + \bar{A} \cdot B \cdot C$$

↓ التحويل إلى أبسط صورة

$$F = A \cdot B \cdot 1 + \bar{C} \cdot 1$$

$$= A \cdot B (C + \bar{C}) + \bar{C} (A + \bar{A})$$

$$= A \cdot B \cdot C + A \cdot B \cdot \bar{C} + A \cdot \bar{C} + \bar{A} \cdot \bar{C} \cdot 1$$

$$= A \cdot B \cdot C + A \cdot B \cdot \bar{C} + A \cdot \bar{C} (B + \bar{B}) + \bar{A} \cdot \bar{C} (B + \bar{B})$$

$$= A \cdot B \cdot C + A \cdot B \cdot \bar{C} + A \cdot B \cdot \bar{C} + A \cdot \bar{B} \cdot \bar{C} + \bar{A} \cdot B \cdot \bar{C} + \bar{A} \cdot \bar{B} \cdot \bar{C}$$

$$X + X = X$$

$$F = B\bar{C} + \bar{A}C$$

Canonical \Rightarrow 3, 6, 7, 8

$$F = B\bar{C} \cdot 1 + \bar{A}C \cdot 1$$

$$= B\bar{C}(A + \bar{A}) + \bar{A}C(B + \bar{B})$$

$$= \cancel{B\bar{C}A} + \cancel{A\bar{B}\bar{C}} + \bar{A}B\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}\bar{B}C$$

Minterm: 1 = 0/0/1 = 0/1/0 = 1/1/0 = 1/1/1

$$F = m_1 + m_2 + m_3 + m_6$$

$$= \sum (1, 2, 3, 6)$$

* لتحويل *

$$m_0 = \bar{A} \cdot \bar{B} \cdot \bar{C}$$

decimal

$$(1)_{dec} = (001)_2$$

Binary \Rightarrow 1 = 0/1/0 = 1/1/0 = 1/1/1

عند التحويل =

A	B	C	F	
0	0	0	0	m_0
0	0	1	1	m_1
0	1	0	1	m_2
0	1	1	1	m_3
1	0	0	0	m_4
1	0	1	0	m_5
1	1	0	1	m_6
1	1	1	0	m_7

$$m_2$$

$$(2)_{dec} = (010) = A' \cdot B \cdot \bar{C}$$

$$m_3$$

$$(3)_{dec} = (011) = A' \cdot B \cdot C$$

$$m_6$$

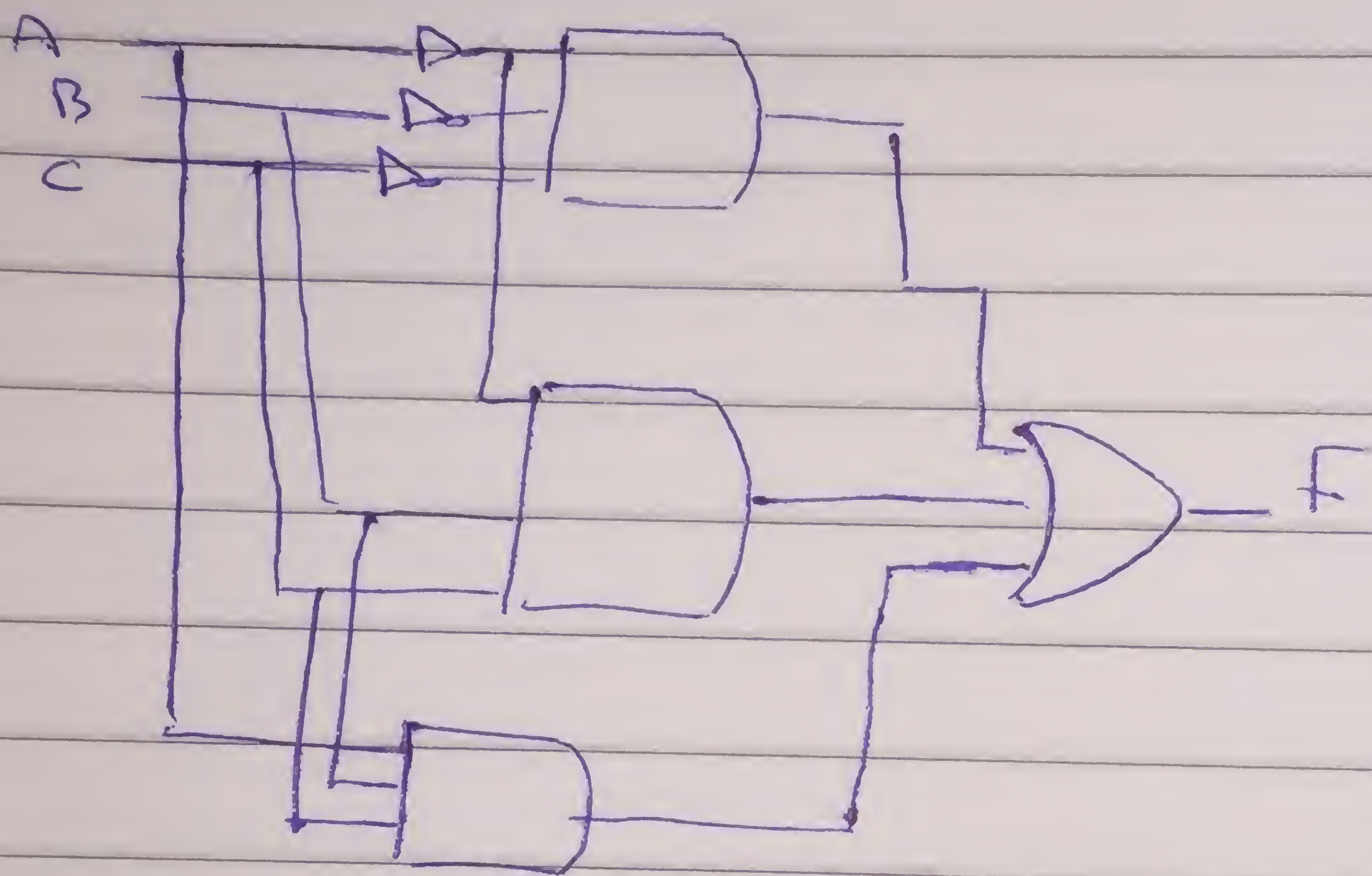
$$(6)_{dec} = (110) = A \cdot B \cdot \bar{C}$$

Example:

$$* F = \sum_{(A,B,C)} (0, 3, 7)$$

$$= m_0 + m_3 + m_7$$

$$\begin{array}{ccc} 000 & 011 & 111 \\ \bar{A} \bar{B} \bar{C} & + A' B C & + A B C \end{array}$$



$$* F(x, y, z) = \sum (1, 2, 10, 11)$$

$$\begin{array}{cccc} 0001 & 0010 & 1010 & 1011 \end{array}$$

$$F = w' x' y' z + w' x' y z' + w x' y z' + w x' y z$$